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THE

BOMBYX MORI

(LINNÆUS)

A Manual of Silk Culture

CONTAINING

COMPLETE INSTRUCTIONS FOR BEGINNERS

AS WELL AS

Practical Directions for Managing a Cocoonery

DESIGNED ESPECIALLY
TO SIMPLIFY THE PRODUCTION OF SILK BY
THE USE OF THE *OSAGE ORANGE* AS A FOOD PLANT IN
LOCALITIES WHERE IT NATURALLY GROWS
IN ABUNDANCE

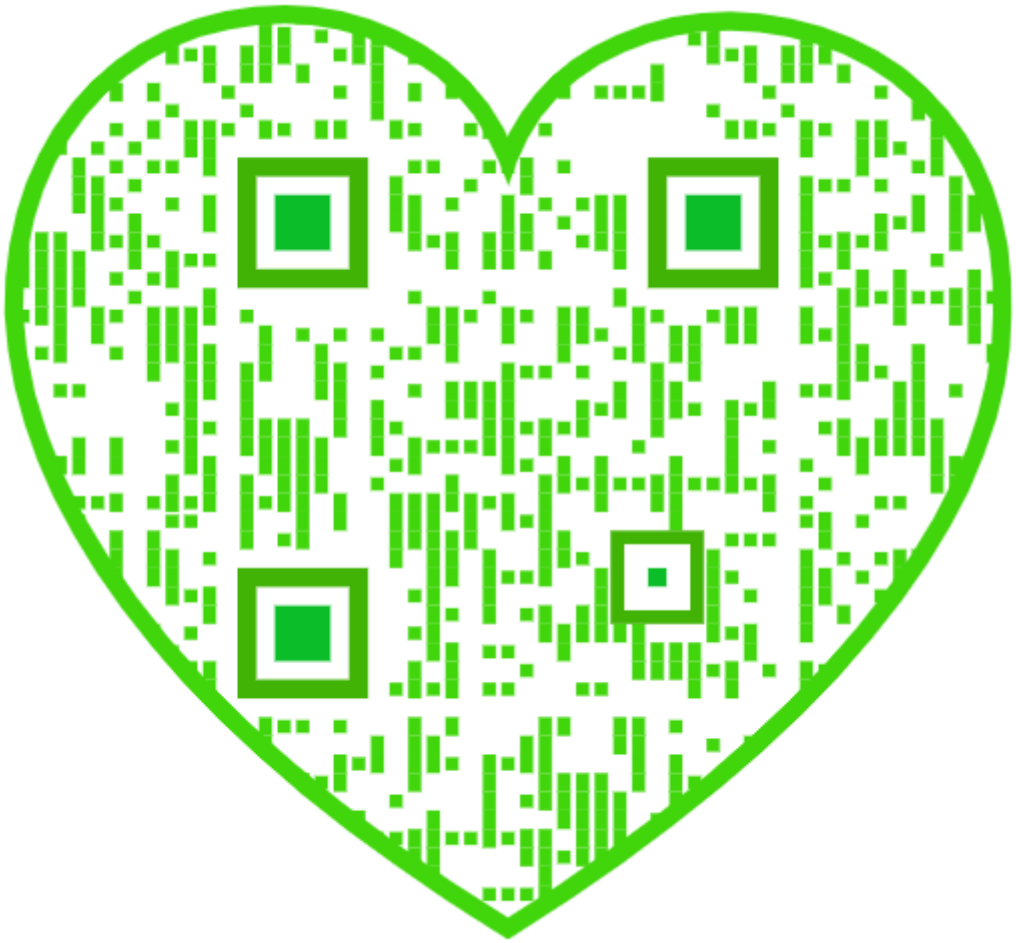
BY

MARY MATILDA DAVIDSON.

SILK WORM MOTH, *Bombyx Mori*, LINNÆUS. (After Riley.)

JUNCTION CITY, KANSAS:
PUBLISHED BY THE AUTHOR.
1882.

PRICE, 25 CENTS.



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SEP 29 1882
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OSAGE SILK WORM, LIFE SIZE. (After Riley.

INTRODUCTORY REMARKS.

IN Kansas and other South-western states, there are thousands of miles of Osage orange hedge. To utilize this wherever grown, as food for the silkworm, is the object of this manual. Prof. Riley, Entomologist of the Department of Agriculture, Washington, D. C., says:

"Every year's experience with the *Maclura*, [Osage orange] confirms all that I have said of its value as silkworm food. Silk that I have had reeled from a race of worms fed on it, now for eleven consecutive years, is of the very best quality, while the tests made at the recent silk fair at Philadelphia, showed that in some instances a less weight of cocoons spun by *Maclura* fed worms, was required for a pound of reeled silk, than of cocoons from Mulberry fed worms.

* * * * * * *

Those who use this plant as silkworm food, must, however, bear in mind that the shoots from a hedgerow become very vigorous and succulent by the time the worms are in the last age. These more milky and succulent terminal leaves should be thrown aside and not used, as they are apt to induce flaccidity and disease. In avoiding these more tender leaves and using only the older and firmer ones, especially when the worms are large, consists the whole secret of the successful rearing of silkworms on this plant, and if care be had in this respect, there will be no appreciable difference in the silk crop from Osage orange as compared with that from Mulberry."

Last year the Woman's Silk Culture Association, of Philadelphia, had silk from Osage fed worms, sent to Itschner's silk factory. It was returned to the ladies with the following

letter: "We send you twenty yards of ribbon made from the silk raised on Osage orange, handed to us during your late Exhibition. We see no difference in the die or weaving from other silk."

This spring the Association had an exhibition at Washington, D. C., in which the fact was developed that some of their best grades of silk were made from the cocoons fed on the Osage. They report that it is tougher in fiber, with less gum, hence wears better. That silk so made is of the most durable quality and most marketable, as is shown by the demands for exportation rapidly increasing; the demand being already greater than the supply. For those who have not the Osage and prefer to plant Mulberry, the *Morus Alba* and *Morus Japonica*, are the hardiest as well as the best varieties, and will grow anywhere in the United States. The instructions for feeding in this book, will answer equally as well for Mulberry, as the methods of feeding and care of the worms, are the same as when Osage is used, except that Mulberry leaves, being larger, are picked from the branches.

Mr. L. S. Crozier, of the Mississippi Silk Company, a noted silk grower, says: "In case the leaves of the grown Mulberry trees are exhausted before the silkworms have spun their cocoons, a well trimmed hedge of Osage orange will be a blessing for American silk growers. But for it, all my silk worms would have starved this last spring, and my cocoons were as fine as if fed exclusively on Mulberry leaves." The greatest objection silkgrowers have had to the Osage was the added labor, and extra time consumed in picking the leaves, but when branches are fed this is entirely obviated. There has been abundant proof that the soil and climatic conditions of Kansas are in every way well fitted for the successful cultivation of silk.

M. de Boissiere, of Silkville, Kansas, says. "The silkworm thrives better in a dry, windy climate, and in this respect we have the advantage over Europe; fewer worms die here even when kept under a common shed, than in Europe, where they are raised in rooms kept at an even temperature by means of stoves; the worms being more vigorous, average larger and heavier cocoons." Silk culture is not advocated as a very lucrative business, but as a home industry it adds largely to the wealth of the nations engaged in it. In France its methods and practice are taught in all the schools

and in the convents. All classes have constantly impressed upon them through the public journals, its usefulness and importance. The raising of a few pounds of cocoons each year, need not materially interfere with other duties, and it is by each household raising a few pounds of cocoons that silk culture must, in the end, be carried on in this, as it has always been in other countries. Large rearing establishments seldom pay.

There are 380 silk mills in the United States. Two-thirds of the raw silk which they use is imported, for which thirty-five million dollars are annually sent abroad. There is no reason why the entire demand of the mills should not be supplied by cocoons produced in this country.

In compiling this manual, I am indebted for information and favors to M. de Boissiere, Senator Plumb, and others, and to Prof. C. V. Riley for permission to use his reports.

THE PUBLISHER.

September, 1882. Junction City, Kansas.

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Preparing the Cocoonery.

FOR a small number of worms—say one thousand—but little preparation is required. Part of a small room, with tables or a few shelves, is all that will be needed. For more extensive feeding, a cocoonery should be fitted up. Any well ventilated room or outbuilding in which a stove can be placed will answer. If not new it must be cleaned and whitewashed. If a room is built for this purpose, let it rest upon posts, several inches from the ground, and put tar around each, to prevent the intrusion of insects. Mice should also be guarded against. It should have windows on opposite sides, to secure good ventilation, and both doors and windows protected by netting. A room eight by twelve feet will accommodate the product of one ounce of eggs—about thirty six thousand—by placing three rows of shelves around three sides of the room. For from one hundred thousand to one hundred and twenty thousand worms, a room twenty by sixteen feet in area, and ten or eleven feet high, will be needed. Shelves should extend around the room, in rows two feet apart, leaving a space for entrance only. To economize room the center may also be fitted up with shelves. The wall shelves may be two feet and those in the center four feet deep. This will leave a convenient space around the room to attend to the worms. To protect from ants, set the posts on which the shelves rest, in basins of water. Foul odors and the fumes of tobacco must be avoided. All wood used about a cocoonery should be well seasoned, as green wood is injurious to the worms.

Conveniences for Feeding.

IT will be found best to have a series of feeding frames provided, for which are needed, laths, small tacks, and twine. Make the trays two feet wide and four feet long. Cut the laths into the required lengths, and nail together edgeways. Set the tacks around the edge one-third of an inch apart, then wind the twine around each

tack, drawing it across the frame both ways, and secure by driving in the tacks. This makes a square mesh. When a large number of trays are made, it is better to have the mesh different sizes, using the smallest first, and the larger as the worms increase in size. To do this set the tacks from one-fifth to one-half inch apart. A small nail with large head should be driven half its length into each corner, to raise the tray up from the shelf. This gives air, allows the excrement to fall through, and prevents the worms being crushed. One tray of this size, will hold at the first age, one thousand worms. Some prefer to dispense with trays, and feed on branches laid on the shelves. This process is not recommended as it involves much more labor and is not so cleanly. Those having used the trays find them a great convenience, saving both time and trouble. If preferred they may be smaller than the size given.

Hatching the Eggs.

IN this climate no special preparation is needed. The greatest difficulty is to keep the eggs from hatching too early. As soon as the leaves appear on the Osage —which is about the middle of April—bring the seed (eggs) in the evening, into the room prepared for them. It is better that the room be not too warm at first, so that the change from cold to warm will be gradual. They will hatch at a temperature from sixty-five to eighty degrees. When the worms begin to appear, which will be in from one to two days, spread over them a piece of mosquito netting, on which lay a few branches or leaves, they will soon crawl up through the netting and the branches will be covered with little black worms almost too small to be seen by the naked eye. Those that hatch the first day, should be removed on the netting and placed in a tray, and marked as first hatch, with day of the month. Treat each day's hatch in the same way until the fourth day, after which it is thought the worms produced are not worth feeding, they are apt to be feeble and perhaps sickly. It is well to bear in mind that the eggs that hatch the soonest will produce the healthiest worms, and will make the largest and heaviest cocoons. The worms hatch in largest numbers from five to eight o'clock in the morning.

Feeding the Worms.

MANY rules have been laid down as to the regularity of feeding, most writers advising four meals a day. Such definite rules are of little use, as much depends upon circumstances and conditions. The food should be renewed whenever the leaves have been devoured or become the least dry. The leaves will keep fresh longer if not picked from the branches. In this respect Osage orange has the advantage of Mulberry, as its spines prevent too close settling, and allow free passage of air. When feeding, fill the trays with small leaf-covered twigs or branches, laid carefully over the worms. The worms eat more freely early in the morning and late at night. Healthy worms require but little rest, and will eat through the night. They eat greedily after each molt, and in the last stages, the quantity of leaves consumed is enormous. It is well in order to feed very early in the morning, to gather the leaves the evening previous, after sundown; this is best also for fear of rain through the night, as wet or damp leaves being very injurious, should never be fed. To keep leaves fresh, cut large branches and place the stems in water. In this sunny climate, we have so little dew in the spring, that leaves can usually be gathered in the early morning, being fresher then than at any other time. Should the season prove unusually cold or damp, and no artificial heat is provided, the worms will lie in a dormant state and eat but little until the genial warmth revives them. In this case they will not mature so early and it will prolong the work. Hence it has been recommended to have a stove in the cocoonery for use on cold or damp days. If the worms are well cared for, and kept in a warm, healthy condition, they will usually arrive at maturity in from twenty-five to thirty-five days. The period of spinning does not depend so much upon the age of the worm, as the quantity of food it has eaten. It is conceded by most silk raisers that the quicker the worm is brought to maturity, the larger the cocoon, the longer the thread, and the better the silk.

Cleaning the Shelves and Trays.

BEFORE placing the trays on the shelves, cover each shelf with paper, so that when cleaned the trays may be lifted up, and the paper drawn out with all the litter which should be shaken off and the paper replaced. This must be done every day. When necessary the trays must be changed to remove the old leaves and other refuse. While the worms are small, this is done by having pieces of white netting* the size of the trays, these may have strips of stiff paper or cardboard sewed around the edges so that in handling, the worms will not fall into the middle. Lay these over the trays and strew with fresh leaves. The worms will soon crawl through and commence feeding. Then take up the netting by the corners and place in a fresh tray. Shake the refuse from the tray and the netting the worms have left, and air for next days use. When the worms have outgrown the netting, use the trays only. If they do not leave the old food readily, they may be removed with a leaf, a straw, or a camel's hair brush. The frequency of changing the trays depends much upon the weather. If damp, the litter soon becomes offensive, and must be removed. It is not necessary to change the trays before the first molt. After this it should be done every two or three days, until the last two ages, when it is absolutely necessary that the worms be changed every day. The necessity of cleanliness cannot be too strongly impressed. If the trays should become foul, or the air of the room impure, sickness will be the result. Especial care should be taken in the last stages, as the worm is more liable to disease at this time.

Molting or Casting the Skin.

THE silkworms shed their skins four times, which are to them periods of sickness. At these times they lose their appetite and appear drowsy, attach themselves to leaves or branches, and stand half erect, moving their heads from side to side. The new head first appears and

*Perforated cardboard to be used instead of netting, also models of a new arrangement for the worms to spin in, which will be found a great convenience, will be furnished by the publisher at moderate prices.

the old skin is gradually worked back until cast off. The first shedding takes place in this climate, three or four days after hatching. The time between each molt—termed ages—is usually from four to six days. If the worms are feeble the old skin will sometimes remain at the extremity of the body, and harden, being unable to cast it off they will soon die. During these molts they should not be disturbed by cleaning or changing the trays. Sudden draughts of air should be avoided. Very little food is required, some writers say that they will do very well for a day or two without any, until all in the same tray have passed through this sickness. This explains the importance of having all in a tray of an age, so that they will molt at the same time.

Separating or Thinning Out.

AS the worms increase in size they will gradually require more room, being at the last age, twenty times as large as at first. They must always have plenty of room to feed, without crowding each other. When separating them, place a tray strewn with fresh leaves over the worms; as soon as enough have crawled through to properly fill the tray, remove it, and replace by another to receive the rest of the worms. Sick or diseased worms may easily be detected at this time, they should be instantly removed and thrown away, also any which have died.

Diseases.

SILKWORMS are subject to various diseases; the most common of these, in this climate, being a kind of jaundice. The worm becomes discolored, assuming a greenish hue, which turns finally to a bright yellow. Dark spots appear about the head, the body is swollen and exudes a yellow fluid. There is no cure known for this or any of the diseases to which the worms are subject; but cleanliness, pure air, and the immediate removal of the diseased worms, will prevent its spreading. It is advisable to wash the shelves and trays with very dilute carbolic acid or any other disinfectant. Too great heat with damp or foul air, over-crowding, and unwholesome food, are the chief causes of disease.

Spinning the Cocoon.

EIGHT or ten days after the last molt, the worm prepares to spin its cocoon. It changes from white, to a cream or amber color, is almost transparent and shrinks in size, the head becoming much smaller. It moves uneasily about, eats but little, and evacuates more freely. It now begins to throw out silken threads. When these indications are noticed such worms should be moved to a separate tray, and conveniences arranged for spinning. Some will spin in the corners of the trays, or in small pieces of paper twisted into cones. Others will want to ascend. For these, branches may be set up on the outside of the trays, interlacing at the top, and mosquito netting laid loosely over. The worms will find their way into this and spin in the folds. When there is a sufficiency of trays, two of these, with spaces between large enough to accommodate the worms, may be set up endwise near them. They will soon find them, climb up between, and form cocoons. Any other device which may suggest itself to the raiser can be adopted.

The worms will soon begin to weave silk threads back and forth, making an enclosure in which is made the cocoon proper. The silk flows more freely in a warm atmosphere. It takes from three to four days to form the cocoon, and three more are required for the worm to pass into the chrysalis state. The cocoon should not be removed short of eight days for reeling or stifling, while if required for eggs it must remain ten or twelve days after the worm has begun to spin. Care must be taken that no two worms form their cocoons too close together, making what is called a double cocoon, which would render them worthless for reeling, although just as good for seed. The cocoon consists of a continuous thread, generally about four hundred yards long. After commencing to spin, the worms will require no food; but as all will not begin at the same time, those that are tardy should be fed often but in small quantities. The temperature of the cocoonery should be kept as even as possible, at from seventy-five to eighty degrees. If it falls below seventy-five degrees it should be raised by artificial heat. If it exceed eighty-five degrees it may be reduced by increased ventilation, mopping the floor, or sprinkling water around the outside of the cocoonery.

Gathering the Cocoons.

IN gathering the cocoons care must be taken not to stain the clean ones, with the black fluid from worms which have died, as there are some of these in almost every cocoonery. The loose or floss silk should first be stripped off and the cocoons separated according to firmness, color, and weight. Any that are stained, soft, or imperfect should be removed, or they will reduce the whole to a lower grade.

Selecting the Seed.

THE best and firmest should be chosen for seed for the coming year, selecting them for the color and fineness of the silk, rather than for the size. If yellow, give preference to the straw colored, as these are most sought after; if white, take the purest white. It is well for silk raisers to raise their own seed, as that brought from large establishments is not always to be relied upon. Two hundred and fifty cocoons, half male and half female, will produce an ounce of eggs, estimated to number from thirty-six to forty thousand, each female laying from three to four hundred eggs. In selecting them, the male cocoon may be known by its being slightly constricted about the center. Its extremities are also more pointed than those of the female, which is somewhat egg shaped, without any constriction. In order to better ascertain the sex, some weigh them, the female always being the heavier. An equal number of each should be taken. These cocoons for breeding, may then be pasted upon cardboard on their side, to enable the moths to escape more readily; or merely laid upon paper in the trays, or on the shelves. They must be protected from rats and mice, which are the enemies of the silkworm in all its stages.

Preparing the Cocoons for Reeling or Sale.

IN order to prepare the cocoon for reeling, the chrysalis must be killed; this must be done in from eight to ten days after the spinning commenced. Steaming is the best method, as dry heat destroys the color and luster

of the silk. Any vessel or box into which steam may be introduced will answer. A good way is to lay the cocoons three or four inches deep, in a sieve or steamer, and place over a pot of boiling water, covering so as to retain the steam. They must remain from fifteen to twenty minutes. After this the cocoons must be spread upon boards or shelves to dry thoroughly, or the dead insect might corrupt and stain the silk. Stir often for the first two or three days, and afterward occasionally for five or six weeks, when they will be perfectly dry, and ready for reeling or shipping; they may be packed in barrels or boxes. In order to preserve them from insects, sprinkle a little powdered camphor gum, or any other insectifuge through them. Reeling establishments have improved facilities for stifling, and if the cocoons can be sent to one of these as soon as gathered, much labor is saved. The cocoons, when dried, will be reduced to one-third of their original weight.

Reproduction.

FROM twelve to twenty days after the worms commenced to spin, the moths will emerge. They are provided with a secretion with which to moisten the end of the cocoon, enabling them to make their escape; in doing this they push aside the threads, but so many are broken that it renders the cocoon unfit for reeling. These are known as pierced cocoons. The moths come out early in the morning, and are moist at first, but soon become dry. The male is known by the continual flutter of the wings, and smaller size. The female moves but little, her body being heavy with eggs. They discharge a reddish fluid as soon as they leave the cocoon, after which they will soon mate, when they must be removed, taking them by the wings and placing on white paper, in a dark room, care being taken not to injure or separate them. As the others mate they should be placed with those already paired. Sometimes a male becomes separated from his companion, when he should be replaced or he may cause disturbance and other separations. If there is a surplus of males, they should be reserved for next day, as there may then be more females. There are differences of opinion as to the length of time required for the perfect impregnation of the eggs, but it is safe to let them remain

together twenty-four hours, when they should be separated by taking the wings of the female in one hand, and gently pressing the body of the male with the other, and drawing them apart. After this the males may be cast aside. As soon as separated the female will discharge a reddish or yellow fluid, they should then be placed upon trays covered with pieces of white cotton cloth on which they are to lay their eggs. They will commence laying soon after being separated, and in twenty-four hours all the impregnated eggs will have been deposited. A natural gum exudes with the egg, which fastens it to the cloth and enables the young worm to eat its way out more readily. The moth being a nocturnal insect should be kept in a dark room, and given plenty of air. Having no jaws the moths never eat but will live a number of days.

Care of the Eggs.

WHEN first deposited the eggs are yellow. If impregnated they soon change to various hues, and finally become and remain a dark gray. The cloths on which the eggs are laid should remain from twelve to twenty days, during which time the bivoltins will hatch out, as there are always some of these in every lot of eggs. These worms if not fed will soon die, but if fed will produce another crop. They require the same treatment as the annuals. The remaining eggs will all be annuals, and must be preserved for next year's crop. Roll these cloths carefully together and place in tin boxes; two or more sides must be perforated to admit air, and the holes protected by fine wire netting. If kept in close boxes the eggs would spoil. They must be kept in a cool room or dry cellar, and examined occasionally to see that the eggs do not become mildewed. The temperature should never be allowed to rise above forty degrees, but may be allowed to sink to freezing point without injury. Great care must be taken as the weather grows warm, to prevent hatching before the leaves appear.

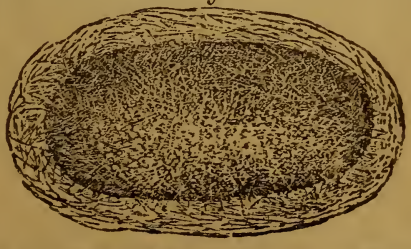
Weighing the Eggs.

IF intended for sale, the pieces of cloth on which the eggs are to be laid should be accurately weighed in Troy grains. After the eggs are laid, the cloths should be again weighed. The difference between the two weights is the weight of the eggs. Both weights should be distinctly marked for the inspection of the purchaser.

Varieties of the Silkworm.

THE silkworm proper, which produces the silk of commerce, belongs to the family Bombycidæ or spinners. Domestication has had much to do with producing the different varieties. Any one of these, transferred to a different climate, changes its character and silk product accordingly. Some varieties produce but one brood a year. These are called Annuals. Bivoltins produce two, the Trivoltins three, and the Quadrivoltins four crops in a year. The Dacey, a variety known in India, produces eight generations in one year. Experiments, taking into consideration the size of the cocoon, quality of silk, time occupied, hardiness, and quantity of leaves required, have proved the Annuals to be the most profitable, although Bivoltins are often reared. The varieties of the Annuals of the color of the cocoons, and the country in which they are most cultivated.

The best known European varieties are, the Milanese, (Italian) which produces a fine yellow cocoon; the Ardeche, Pyrenean, and Cevennes, (French) which produce the large yellow and straw colored cocoons, and are considered the hardiest and best adapted to the eastern, middle, and western states. The Brousse (Turkish) which produces a white cocoon. The latter variety is the most valuable in commerce; but the races which produce the colored cocoons, are considered the most healthy.



OSAGE SILK WORM—COCOON.—(After Riley.)

Letter from a Prominent Silk Grower.

WILLIAMSBURG, KANSAS,
July 27, 1882.

Miss M. M. Davidson,

Junction City, Kansas:

Your favor of 22nd inst., came duly, and I am pleased to know you succeeded so well with your silkworms. The rearing of silkworms is a very simple business, requiring but little capital and such care as can be given to it in most families without seriously interfering with domestic labors.

The only open question with us is market for cocoons; and this, in my judgment, depends upon the successful establishment of filatures. Hand reeling is a slow, tedious process, and compared with the work done in well organized reeling establishments and by trained experts, it is costly in several ways: first, because the hand reel requires the labor of two persons to operate it—one to turn the reel and one to attend to the cocoons—whereas one girl can attend several reels driven by power; second, silk reeling is a very delicate operation; the fiber is fine and unless the reeler is thoroughly skillful, she will waste more than the value of her wages. Hand reeling in the family will be rather an incident than a permanent occupation. At home much unskilful work will be done and much waste silk made; whereas in the organized filature, the labor is continuous and the reeler becomes expert, or loses her place.

Another advantage of moment is that in the filature, the cocoons can be graded, as cotton must be graded, with reference to its fitness for particular uses. In the family which produces one hundred to three hundred pounds of cocoons, grading is impracticable. A further important advantage the organized establishment has is that the manufacturers can there find a uniform product in quantities to suit; while in family reeling the quantity would be small, a few pounds, at most, in one place, and the product variable, some of it well reeled, some of it badly reeled—that is the thread will be uneven from lack of skill in adding new fiber as the old runs off, or from a difference in the number of fibers to the thread. Silk thus produced and collected would be less valuable to the manufacturer.

There is a broad belt across our continent well adapted to silk production and the interest in the business is increasing at such rate that attention has within the last two years been given to reeling as an organized industry. Edward Serrell, Jr., has invented an automatic stop motion reel, and several parties in this country propose to establish filatures. Among them the Mississippi Silk Company, at Corinth, Mississippi, L. S. Crozier, manager, they will test the Serrell reel. If successful, silk may become a staple product in America.

Cocoons at fifty cents per pound, green, or one dollar and fifty cents per pound, dry, will pay very well, more especially as the income to the family will be almost a gratuity—an addition with but

little outlay. For some statistics of cost and prices of silk, see article In *Scientific American* of June 10, 1882, by the American Consul at Lyons, France, F. C. Peixotto.

Respectfully yours,

CHAS. SEARS.

P. S.—In the absence of M. de Boissiere I reply to your letter.

C. S.

Extract from letter of F. C. Peixotto, American Consul at Lyons, France, to the *Scientific American:*

"The following figures concerning silk reeling may be relied upon as accurate, and I trust will be found of service in showing with some degree of clearness what are the facts in the case. At present quotations [June, 1882] a pound of yellow French cocoons—dry—is worth $1.20 in the markets of Marseilles and Milan. To produce a pound of raw silk requires on an average three and six-tenths pounds of such cocoons, thus making the cost of the raw material for a pound of silk $4.32. There is also produced in reeling a by-product called "frision" coming from the silk upon the cocoons, which is not transformed into thread. This is worth about seventy cents for each pound of silk produced. Deducting this amount from the total cost of cocoons, there remains $3.62 as the cost of the silk in the cocoons, which is to be transformed into a pound of raw silk. The value of the pound of raw silk when produced, depends very largely upon the skill of the reeler, and the more or less favorable circumstances under which the reeling is performed. Badly reeled silk produced from good cocoons is worth at present a little less than $3.40 a pound, somewhat less, in fact, than the market price of the cocoons necessary to produce it. [This silk is probably quite as well reeled as it would be if produced by American women working in an irregular way in their own houses.] On the contrary, silk produced by the best filatures and exceptionally well reeled, sells on an average of present prices, at six dollars a pound. In point of fact it has become impossible for women to gain anything by reeling at home."

Facts and Figures.

Estimates made by Prof. Riley, in Special Report No. 11. Profits made by producing cocoons:

" Average number of eggs per ounce 40,000. Average number of fresh cocoons per pound, 300. Average reduction in weight for choked [or stifled] cocoons sixty-six per cent. Maximum amount of fresh cocoons from one ounce of eggs one hundred and thirty to one hundred and forty pounds. Allowing for deaths in rearing—twenty-six per cent. being a large estimate—we thus get as the product of an ounce of eggs, one hundred

pounds of fresh, or thirty-three pounds of choked cocoons. Two adults can take charge of the issue of from three to five, say four ounces of eggs, which will produce four hundred pounds of fresh or one hundred and thirty-three pounds of choked cocoons."

"Calculating on the basis of $1.25 per pound for choked cocoons, gives $166.25 for the one hundred and thirty-three pounds. After deducting expenses, a very fair profit will be realized. There are several filatures in the United States where cocoons are purchased, and others are being erected."

ESTIMATE OF PROFITS MADE BY RAISING EGGS.

"Average number of eggs in an ounce, forty thousand. Maximum number of cocoons from an ounce of eggs, forty thousand. One-half of these, or twenty thousand, are females. Number of eggs laid by each female, say three hundred. Quantity of eggs from one ounce, six million, or one hundred and fifty ounces. Deducting as probable loss from all causes combined, one-half, we have seventy-five ounces. Price of eggs in Europe two to five dollars, say three dollars an ounce. Amount realized on one ounce $225.00."

An extra month will be required for the production of eggs. The pierced cocoons that have been used for breeding purposes have also a certain market value, they are sold with the floss silk and are carded and spun like cotton, they sell at from fifty to seventy-cents per pound, according to quality. The given estimates are all low; no fixed rates can be given, as the prices of silk products vary.

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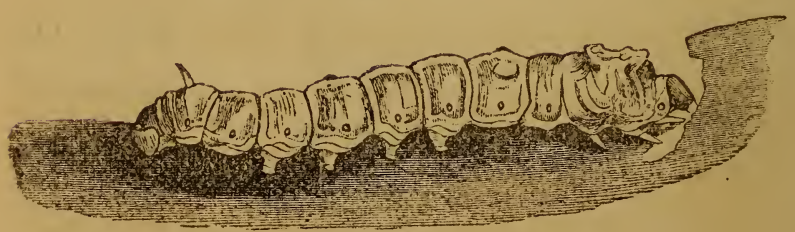

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